

Vaccinating the International Traveler: Avoiding Unwelcome Souvenirs



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Workshop objectives

- ▶ **Review currently available travel vaccines and their indications based on the travelers' itinerary**
- ▶ **Identify special populations of travelers and specific vaccine concerns**
- ▶ **Describe required vaccinations for certain countries and WHO regulations**

PARENTS ARE PLANNING TO TAKE
THEIR 3 CHILDREN TO EL SALVADOR
FOR 4 MONTHS TO VISIT FAMILY. THEY
WILL STAY IN THE CAPITAL CITY FOR 2
MONTHS AND BE IN RURAL AREAS FOR
2 MONTHS. THE PARENTS ARE
HEALTHY. THE CHILDREN ARE 4
WEEKS, 2 YEARS AND 5 YEARS OLD.
THEY ARE LEAVING IN ONE MONTH.
THEY ARRIVE TO GET THEIR SHOTS...

Vaccinating the traveler

- ▶ *Routine vaccines*

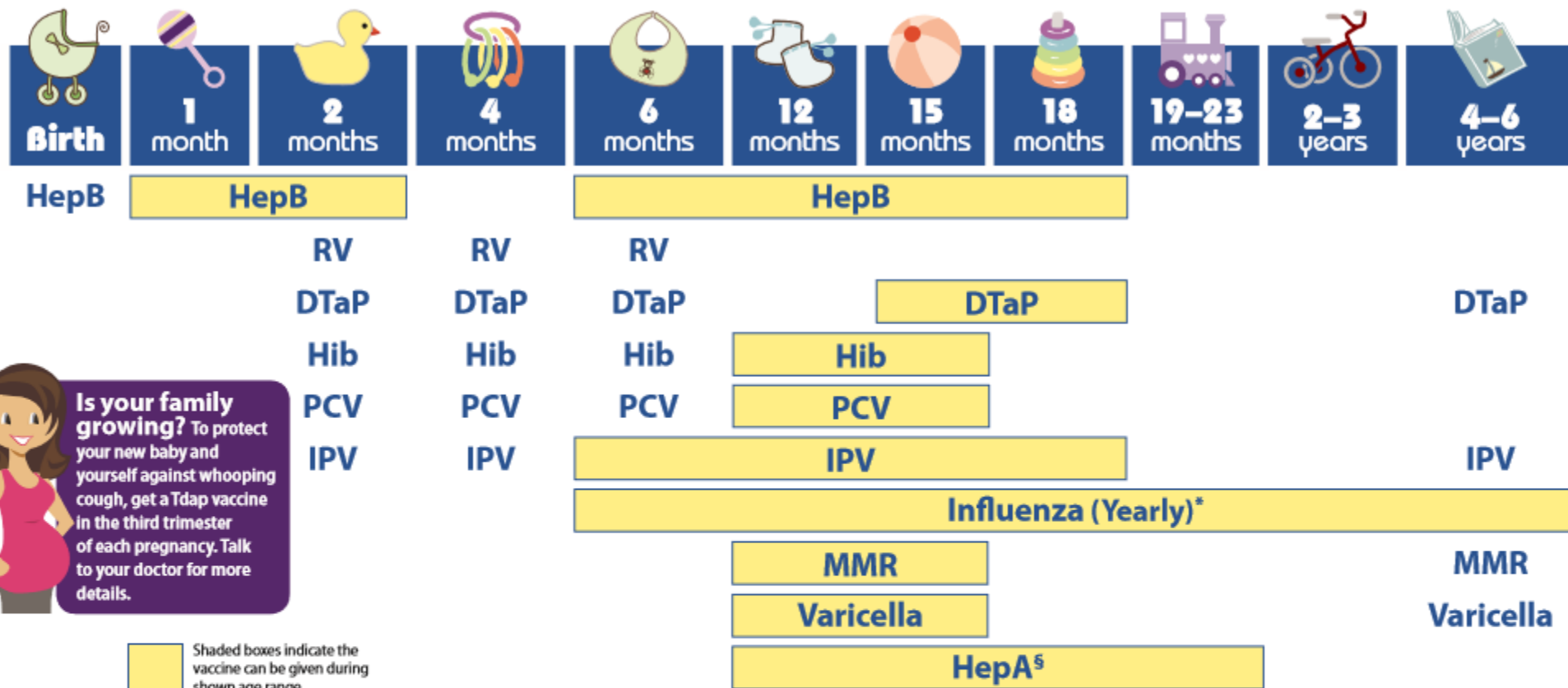
- ▶ accelerate as needed
- ▶ update

- ▶ *Required vaccines*

- ▶ Yellow fever
- ▶ Meningococcal meningitis (Hajj)

- ▶ *Recommended*

2015 Recommended Immunizations for Children from Birth Through 6 Years Old



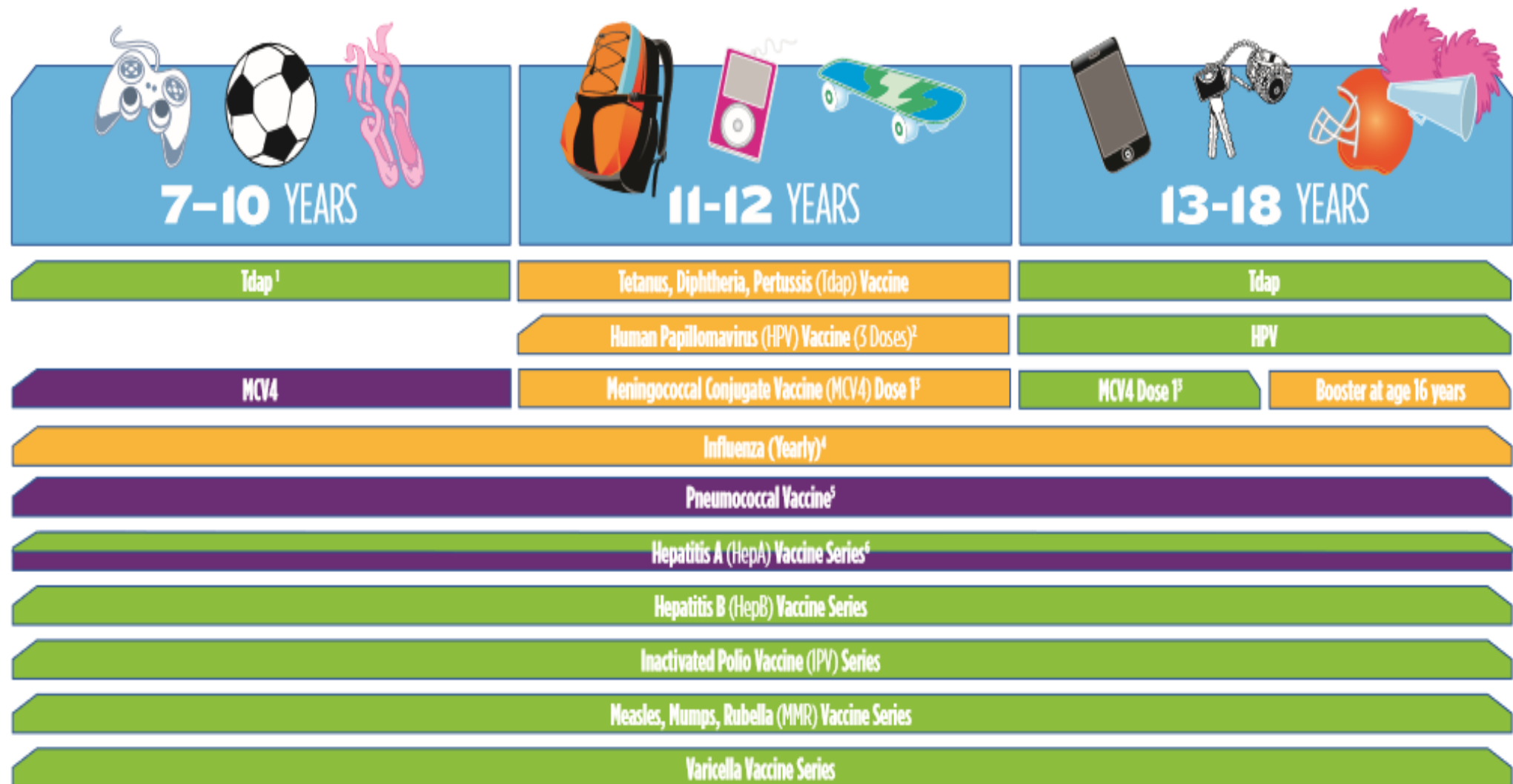
NOTE: If your child misses a shot, you don't need to start over, just go back to your child's doctor for the next shot. Talk with your child's doctor if you have questions about vaccines.


FOOTNOTES:


- * Two doses given at least four weeks apart are recommended for children aged 6 months through 8 years of age who are getting an "injected" flu vaccine for the first time and for some other children in this age group.
- ⁵ Two doses of HepA vaccine are needed for lasting protection. The first dose of HepA vaccine should be given between 12 months and 23 months of age. The second dose should be given 6 to 18 months later. HepA vaccination may be given to any child 12 months and older to protect against HepA. Children and adolescents who did not receive the HepA vaccine and are at high-risk, should be vaccinated against HepA.


If your child has any medical conditions that put him at risk for infection or is traveling outside the United States, talk to your child's doctor about additional vaccines that he may need.

SEE BACK PAGE FOR MORE INFORMATION ON VACCINE-PREVENTABLE DISEASES AND THE VACCINES THAT PREVENT THEM.



 These shaded boxes indicate when the vaccine is recommended for all children unless your doctor tells you that your child cannot safely receive the vaccine.

 These shaded boxes indicate the vaccine should be given if a child is catching-up on missed vaccines.

 These shaded boxes indicate the vaccine is recommended for children with certain health conditions that put them at high risk for serious diseases. Note that healthy children **can** get the HepA series⁶. See vaccine-specific recommendations at www.cdc.gov/vaccines/pubs/ACIP-list.htm.

Accelerating routine vaccines

	<u>AGE</u>	<u>MIN INTERVAL</u>
DTaP	6 wks	4 wks
IPV	6 wks	4 wks
Roto	6 wk	4 wks
Hib	6 wks	4 wks
Hep B	birth	4 wks
PCV13	6 wks	4 wks
MMR	6-11 mo, repeat at 12 mo old	

A couple, ages 28 and 34yrs, are going to Europe for 6 weeks and come in to update their tetanus shots.

They had primary series vaccines as children, but have no records.

They will be traveling in France, Spain and Italy.

Adult update

- ▶ **Tdap**
- ▶ **Check measles and varicella status**
- ▶ **Flu vaccination**

Worldwide, measles continues to decline...

	Deaths	Disease
2000	542,000	853,500
2011	158,000	355,000
2014	122,000	226,722
	78%↓	77%↓

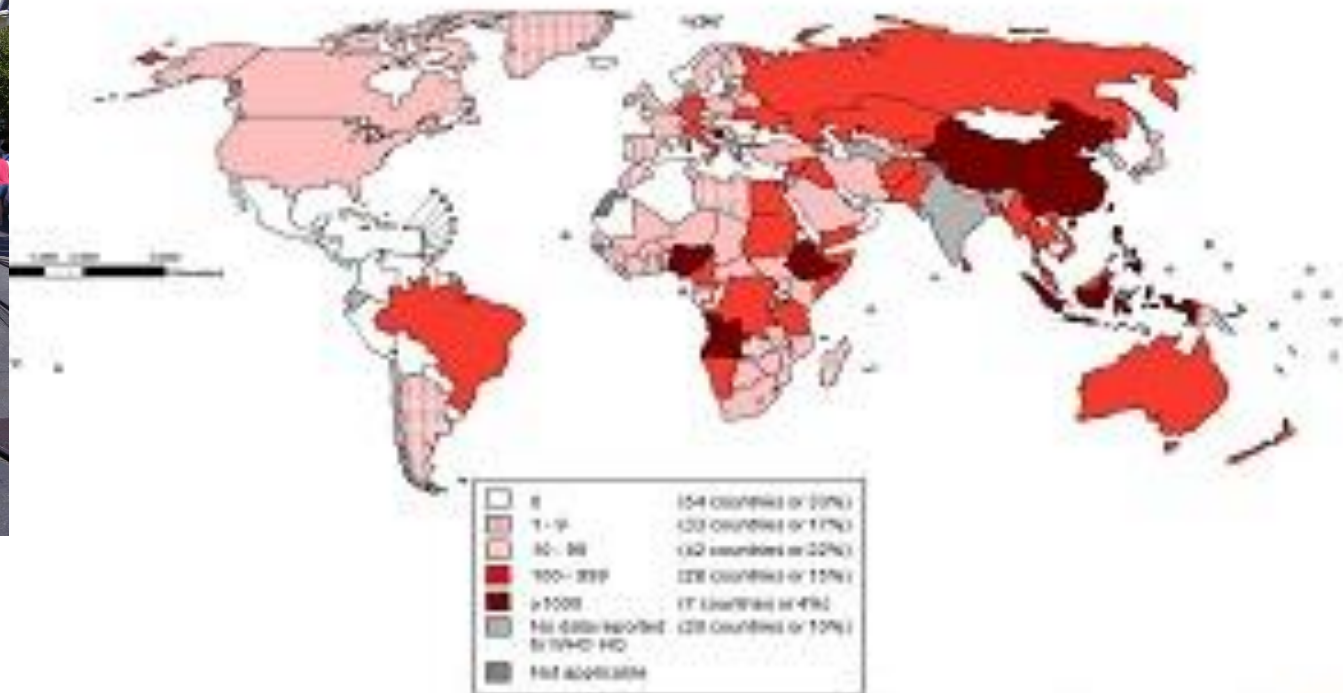
WHO 2014

2015 Measles Cases and Outbreaks

Current information for ongoing Measles outbreak



Number of Reported Measles Cases with onset date from Jun 2014 to Nov 2014 (6M period)



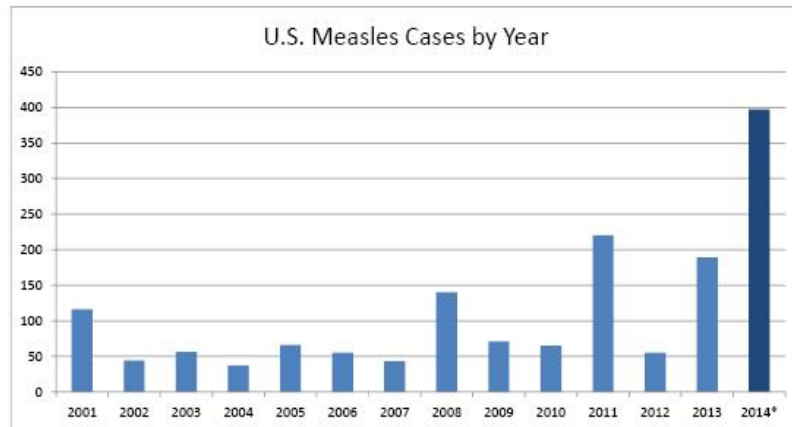
Measles Cases and Outbreaks, January 1 to June 6, 2014*

397
Case

reported in 20 states: Alabama, California, Connecticut, Hawaii, Illinois, Kansas, Massachusetts, Minnesota, Missouri, New Jersey, New York, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah, Virginia, Wisconsin, Washington

16
Outbreaks

representing 84% of reported cases this year



*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases



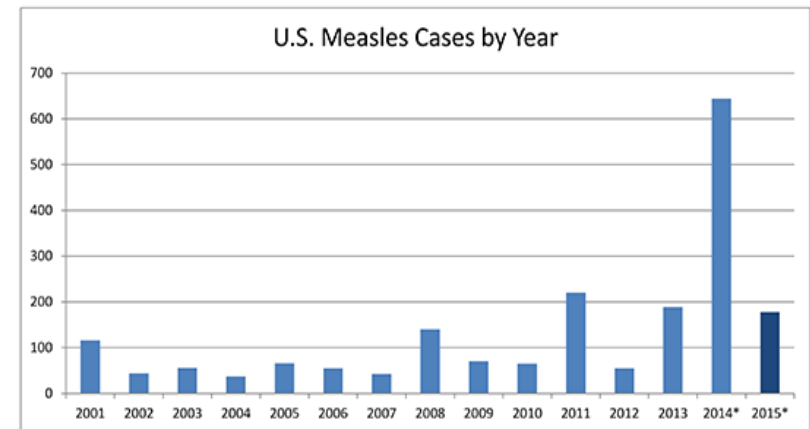
Measles Cases and Outbreaks January 1 to March 27, 2015*

178
Cases

reported in 17 states and the District of Columbia: Arizona, California, Colorado, Delaware, Georgia, Illinois, Michigan, Minnesota, Nebraska, New Jersey, New York, Nevada, Pennsylvania, South Dakota, Texas, Utah, Washington

4
Outbreaks

representing 89% of reported cases this year



*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases



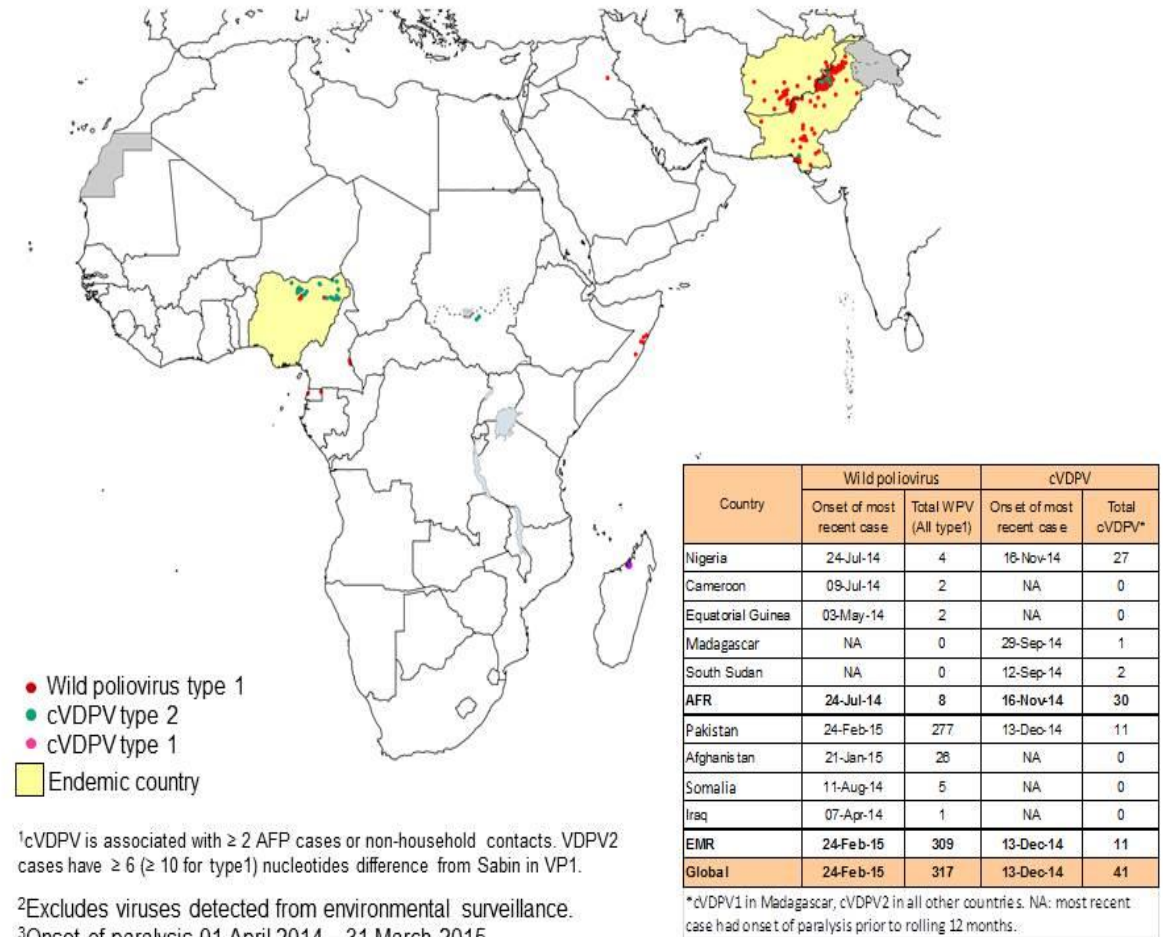
Measles #2: travel vaccine

- ▶ Consider for itineraries not typically considered high risk travel
- ▶ **Not** a booster: 5% of children do not respond to the 1st dose of measles vaccine
- ▶ 2nd dose covers non-responders
- ▶ May give 2nd dose 1 mo after the first dose
- ▶ Doses given before 12 mo old – not “countable” and must be repeated
- ▶ 145 countries have instituted a 2nd dose

Polio vaccination

- ▶ Under- or unimmunized children and adults are at risk when traveling in areas where wild poliovirus is endemic
- ▶ Oral polio vaccine is no longer available nor recommended
- ▶ Booster recommended once in adolescence or adulthood if traveling. Minimal data on waning immunity.
- ▶ Changing recommendations for travel to Middle East

Wild Poliovirus & cVDPV¹ Cases², Previous 12 Months³



Varicella

- ▶ Not prioritized in global imz programs
- ▶ Tropical climates : seroconversion later adulthood; seasonal variation
- ▶ 2 dose schedule- 12-18 mos, then at 4-6 ys but can be as soon as 3 mos after first
- ▶ MMR-V for second dose only

Travel vaccines to consider

- ▶ Yellow fever
- ▶ Hepatitis A
- ▶ Typhoid
- ▶ Rabies
- ▶ Meningococcal meningitis
- ▶ Japanese encephalitis
- ▶ Influenza

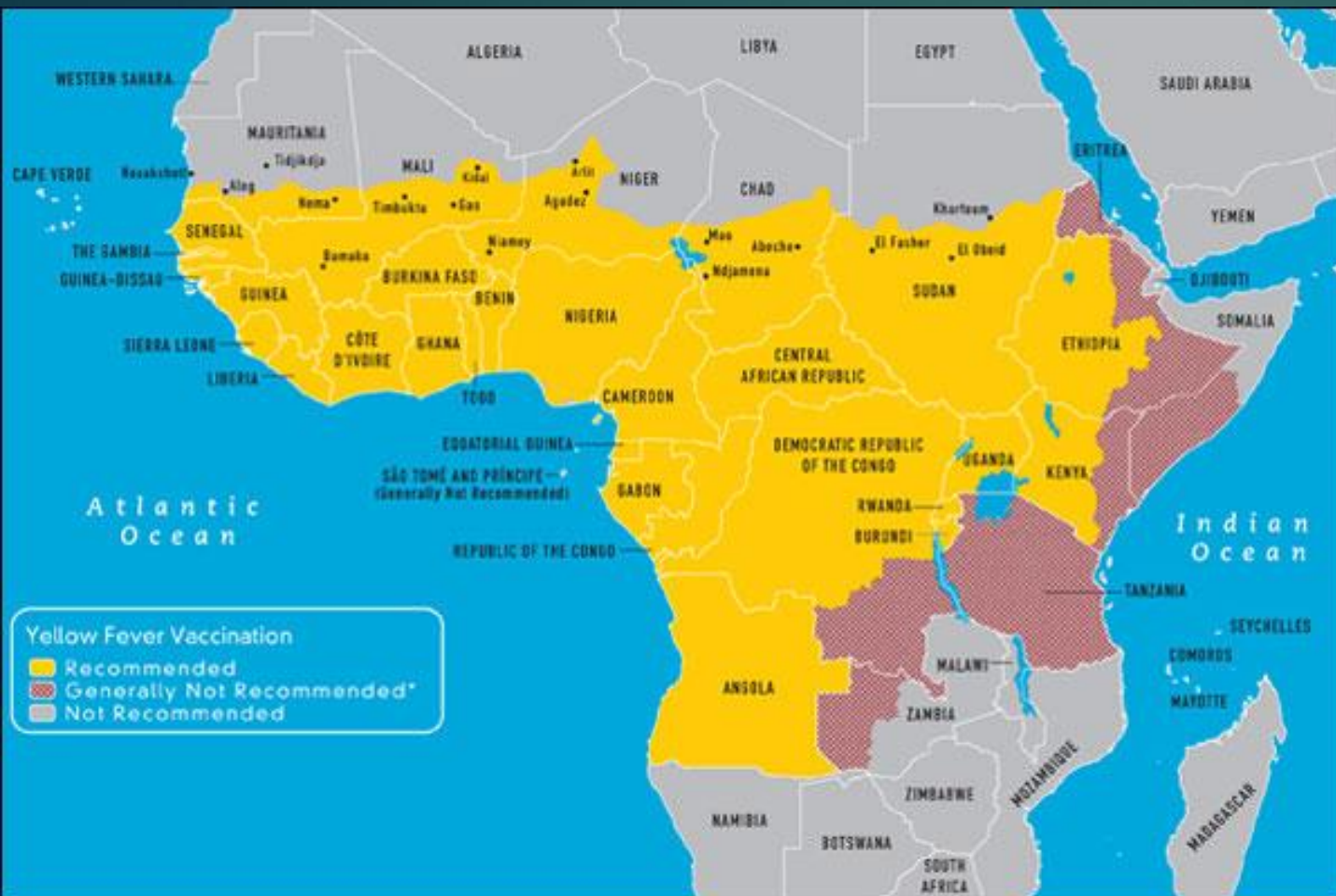
Required Immunizations

- ▶ Yellow Fever- *Required* under WHO International Health Regulations (2005)
- ▶ Meningococcal meningitis- *Required* by Saudi Arabia for pilgrims attending the Hajj in Mecca
- ▶ These 2 vaccines may also be *recommended* based on risk of disease on a given journey

A family with 2 children is going to Ecuador. They will spend 1 wk in the Galapagos and 1 wk in the Amazon Basin on a jungle expedition. Their 9 yr old son has ADHD and is on Methylphenidate twice daily. He is otherwise healthy and UTD on his vaccines, as is his sibling.

What travel vaccines are indicated?

- ▶ Yellow fever
- ▶ Hepatitis A
- ▶ Typhoid
- ▶ Meningococcal meningitis
- ▶ Rabies
- ▶ Japanese encephalitis



Yellow Fever Vaccine

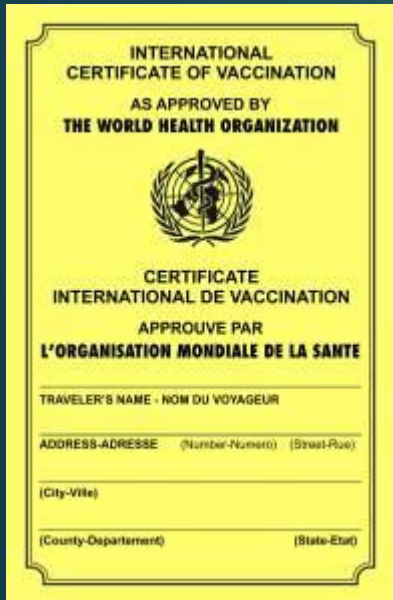
- ▶ Age related risk of post-vaccine encephalitis
- ▶ Contraindicated :
 - ▶ <6 mo olds
 - ▶ egg allergy
 - ▶ Thymus disorder associated with abnormal immune function
 - ▶ Primary immunodeficiencies/ Symptomatic HIV
 - ▶ Malignant neoplasms/Transplantation
 - ▶ Immunosuppressive and immunomodulatory therapies
- ▶ Caution :
 - ▶ >60 yo - reported cases of YF associated encephalitis emerged in 2000 in elderly
 - ▶ Asymptomatic HIV infection (with caveats)
 - ▶ Pregnancy
 - ▶ Breastfeeding

Yellow Fever Vaccine Adverse Events

- ▶ **First time vaccinees**
- ▶ **Viscerotropic**
 - ▶ ~3-5 cases /million doses
 - ▶ 2-8 days post vaccine
 - ▶ Non-specific sx's progress to multiorgan failure w/ 50% mortality
- ▶ **Neurotropic**
 - ▶ ~5 cases /million
 - ▶ 4-27 days post vaccine
 - ▶ Encephalitis, Guillian- Barre → <5% mortality

Assessing Risk of Yellow Fever Vaccine Adverse Events

- ▶ Age: infants and elderly at increased risk
- ▶ Immunocompromised individuals may be at increased risk (live virus vaccine)
- ▶ Risk benefit ratio will increase when risk of disease is very low or non-existent
- ▶ Individuals at risk for yellow fever should receive yellow fever vaccine
 - ▶ International Certificate of Vaccination
 - ▶ Valid 10 days after first dose for 10 years



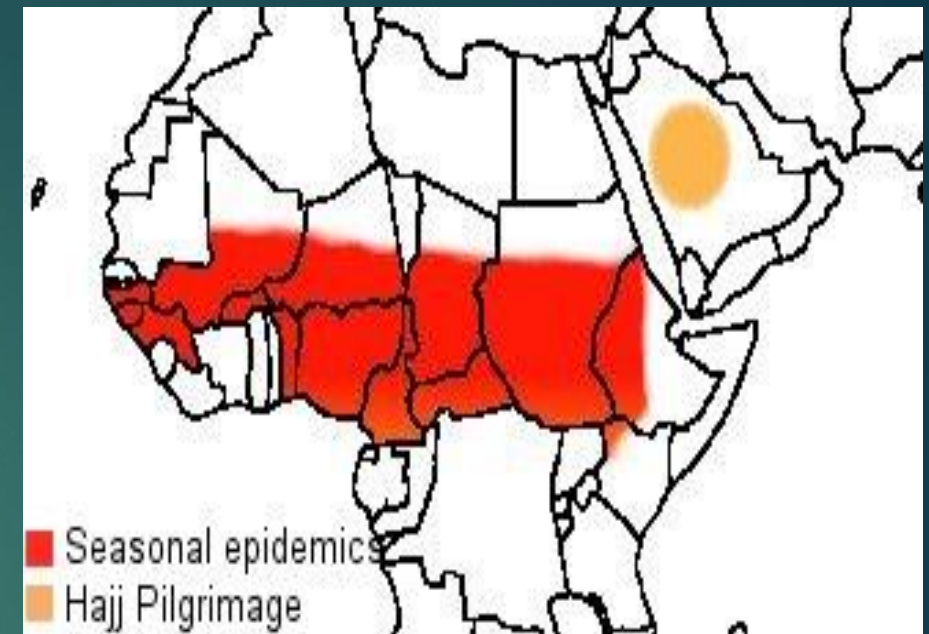
A 70 yr old man and his 66 yr old wife are traveling in 2 months on a “five star” safari to Kenya **and** South Africa. He has non-insulin dependent diabetes and takes HCTZ for hypertension and takes Prozac for mild anxiety. She is on estrogen replacement and uses an Albuterol inhaler for asthma.

Meningococcal meningitis vaccines

- ▶ Polysaccharide : Menomune
- ▶ Conjugate : Menactra/Menveo
 - ▶ Both protect against ACWY disease
- ▶ Hib-MenCY-TT- MenHibrix
 - ▶ Indicated at 2-9 mos , but not for travel protection!

Recommended:

Sub-Saharan Africa dry season (Dec-June)



Meningococcal Conjugate Vaccines (MenactraTM/MenveoTM)

- ▶ Capsular polysaccharides linked to carrier proteins
- ▶ T-cell dependent response produced
 - stronger immune response
 - induces immunologic memory
 - booster responses
- ▶ Preferred vaccine for 2 mo*-55 yr olds
- ▶ Routine vaccine at 11 yo in US .

****Recommended booster at 16 yo**

▶ **Menactra™ (MenACWY-D)**

- ▶ 9 mo - 55 yr old
- ▶ 2 dose series 9 mo- 23 mo

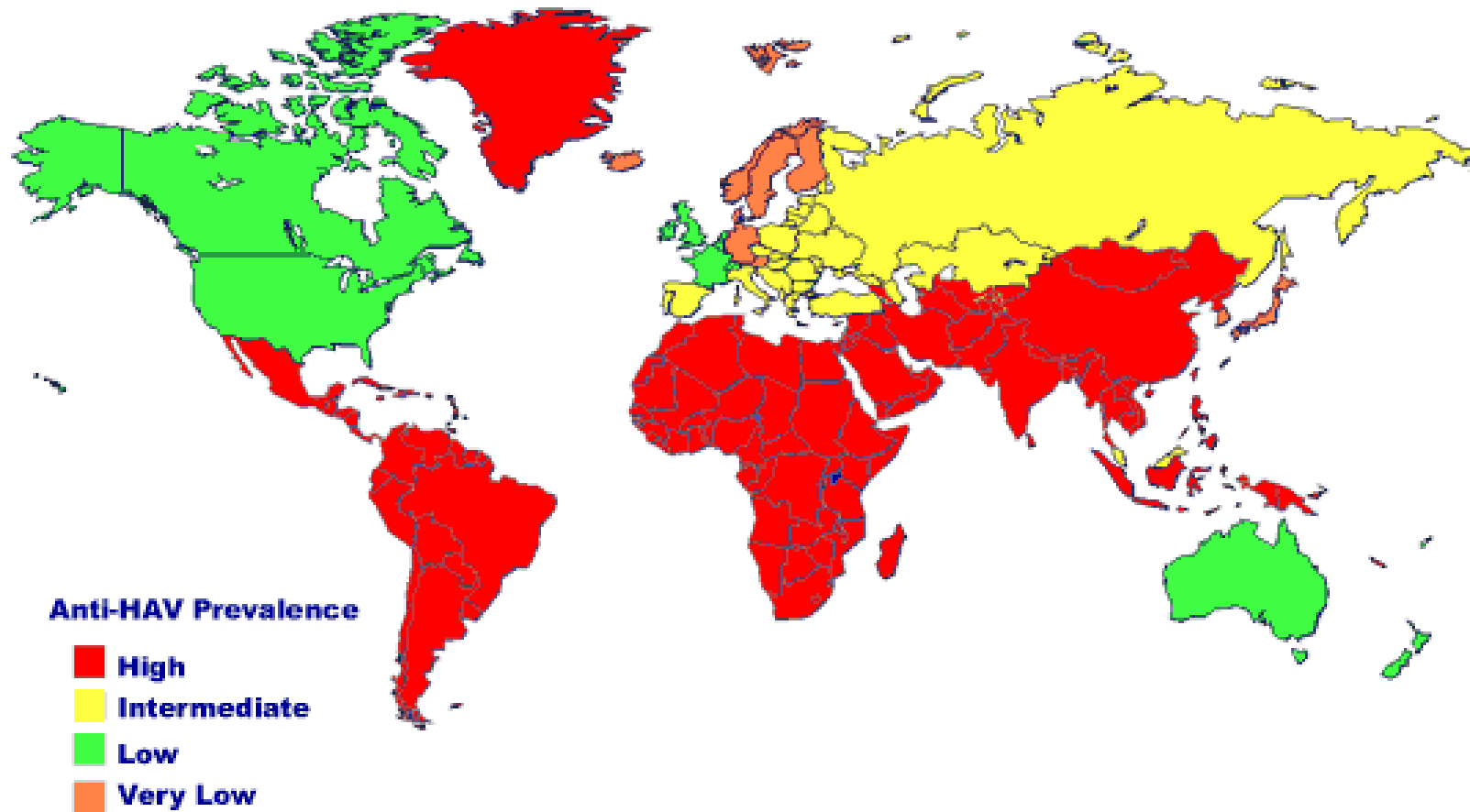
▶ **Menveo™ (MenACWY-CRM)**

- ▶ 2 mo -55 yr old
- ▶ 2 dose series 7 mo-23 mo
- ▶ 4 dose series 2 mo- 6 mo

▶ **MenHibrix™ (Hib-MenCY-TT) #not for travelers**

- ▶ Licensed 2/13 Hib/Men C and Y/tetanus)
- ▶ 4 dose series : 6 wks – 18 mos

Geographic Distribution of HAV Infection



Hepatitis A vaccine

- ▶ **Recommendations**

U.S.: > 1 years old

- ▶ **Role of maternal antibody interference with seroconversion response**

- ▶ **vs. Immune globulin**

Efficacy of Hep A Vaccines

- ▶ **Protective efficacy of hepatitis A vaccines is 94-100% in clinical trials**
- ▶ **Protective antibody may persist more than 20 years (after 2 doses of vaccine)**
- ▶ **Either vaccine may be used for the second dose of the series**
- ▶ **No need to restart series if large interval between doses; just give second dose**

Combined Hepatitis A- Hepatitis B vaccine (TWINRIX)

- ▶ **Approved in U.S for > 18 years old**
 - ▶ 720 U Hep A + 20 mcg HepB
- ▶ **Pediatric formulation : Europe**
 - ▶ 360 U Hep A + 10 mcg Hep B
 - ▶ 1-15 yr olds: 0,1,6 mo schedule

An 17 yr old female is going on a high school work program with a local organized group to Costa Rica for six weeks. She will be living with a family while there. She is in good health and takes oral contraceptives daily. Her immunizations are up to date.

She arrives with a list of required vaccines and medications.

Areas of Risk for Typhoid



Dark green: high risk Light green: moderate risk

Modified from: <http://vaccinereview.com/wp-content/uploads/2009/08/typhoidmap.jpg>

Typhoid Fever

- ▶ Bacterial infection from *Salmonella typhi* causing fever, myalgia, anorexia, abdominal discomfort, headaches, constipation, diarrhea, rose spots
- ▶ Rehydration, antibiotics
- ▶ Vaccination recommended for high-risk areas
 - ▶ **Highest risk travel is India**
 - ▶ Smaller cities, villages, or rural areas off the usual tourist itineraries
 - ▶ Prolonged exposure to potentially contaminated food or drink

Typhoid Vaccine

▶ Oral Ty21a

- ▶ >6 yrs old in US
- ▶ 4 caps, 1 po q.o.d with cool liq.
- ▶ Boost every 5 years

▶ Vi Polysaccharide

- ▶ >2 yrs old
- ▶ Injectable
- ▶ one dose, boost every 2-3 years

A family is taking their 4 healthy children, ages 2, 6, 10 and 12yrs, to India for the summer.

They will be in Bombay for one month and travel to other areas by bus.

There are many dogs in their relative's home. The 12 year old was there 3 yrs ago and had no problems except diarrhea.

What travel vaccines are indicated?

- ▶ Yellow fever
- ▶ Hepatitis A
- ▶ Typhoid
- ▶ Meningococcal meningitis
- ▶ Rabies
- ▶ Japanese encephalitis

Rabies, countries or areas at risk



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or town or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: WHO Rabies/CDC
Map Production: Public Health Information
and Geographic Information Systems (PHGIS)
World Health Organization



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Rabies Vaccine

- ▶ >55,000 deaths/yr worldwide
- ▶ 50% of all human rabies in <15 yr olds
- ▶ *Consider* pre- exposure prophylaxis for children traveling for extended periods to rural, remote, or developing areas



Rabies pre-exposure vaccination

Human Diploid Cell Vaccine (HDCV)
or Purified Chick Embryo Cell (PCEC)

- ▶ 3 dose schedule : 1, 7, 21 or 28 days
- ▶ Intramuscular (NOT intra-abdominal!)
- ▶ 1.0 ml dose all ages

*Pre-exposure series = no need for
Rabies Ig if exposure occurs*

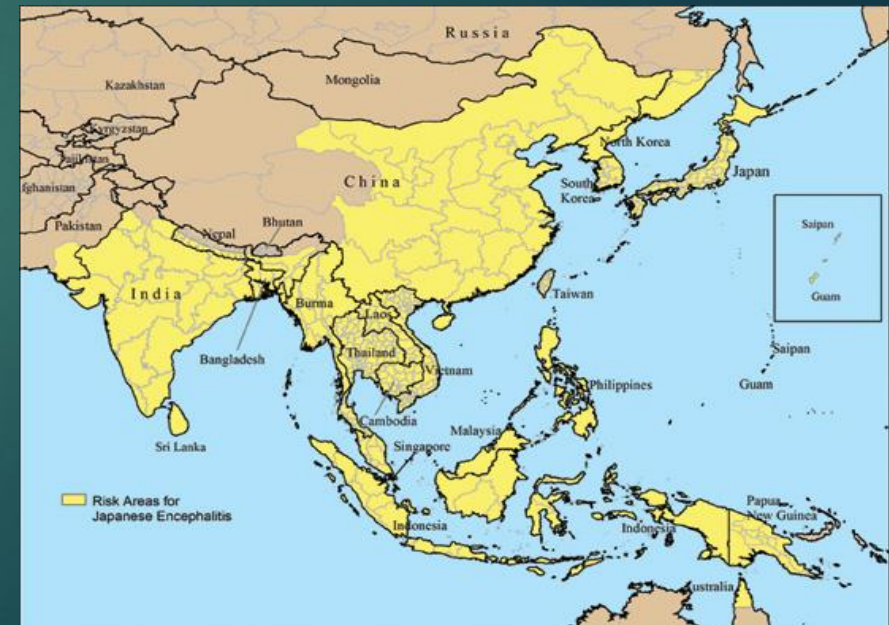
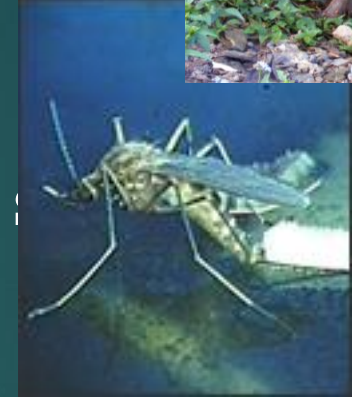


Japanese Encephalitis Vaccines

► Indications:

- > 1 month in endemic area during transmission
- Ixiaro[®] (Inactivated cell culture derived)
 - 2mo - 2 yrs : 0.25 ml IM dose; 0 and 28 days
 - >2 yrs : 0.5 ml IM dose (same as adults) “
 - Booster- data only available on >17 yo

► Options abroad



Vaccination dilemmas

- ▶ **Age related contraindication**
- ▶ **Refuses / declines**
- ▶ **Unavailable**
- ▶ **Cost**

Minimum ages- U.S.

- ▶ Yellow fever - 9 months
- ▶ Hepatitis A - 1 yrs
- ▶ Typhoid
 - ▶ inj - 2 yrs
 - ▶ oral - 6yrs
- ▶ Rabies - no minimum
- ▶ Meningococcal meningitis – 2 mo
- ▶ Japanese encephalitis – 2 mo
- ▶ Influenza - 6 months



Vaccinations & breastfeeding

- ▶ Very little data available
- ▶ Generally, no contraindications , except:

Yellow fever	Vaccination of nursing mothers should be avoided because of the theoretical risk for transmission of 17D virus to the breastfed infant. When travel to high-risk yellow fever-endemic areas cannot be avoided or postponed, nursing mothers can be vaccinated.
Vaccinia (Smallpox)	Women who are breastfeeding should not be given this vaccine. If there is a smallpox outbreak, recommendations on who should get vaccinated may change.

What is the most common
vaccine-preventable disease of
travelers?

Reluctance to vaccinate

- ▶ **Thimerosal**

- ▶ Link to increased autism rate refuted
- ▶ Removed from routine vaccines in 2000

- ▶ **Autism**

- ▶ Data disputes association
- ▶ Resources for counseling : www.chop.edu/vaccines,
www.cispimmunize.org

Thimerosal content

- ▶ **None:**

- ▶ YF - Rabies
- ▶ Typhoid - dT
- ▶ Hep A

- ▶ **Trace:**

- ▶ Menomune multi-dose vial
- ▶ Pediatric DT
- ▶ Tetanus toxoid

- ▶ www.vaccinesafety.edu

Beyond vaccines and anti-malarials...

- ▶ Sun, safety, carseats
- ▶ Logistics/Comfort issues
- ▶ Teen issues /Infants
- ▶ Environmental hazards
- ▶ Altitude
- ▶ Dengue & Chikungunya
- ▶ Traveler's diarrhea rx
- ▶ Animal avoidance- rabies awareness/treatment
- ▶ Medical emergencies / evacuation insurance



Vaccine Resources

- ▶ Vaccine.chop.edu
- ▶ Immunize.org
- ▶ Shotbyshot.org
 - ▶ Stories of preventable diseases
- ▶ cdc.gov/vaccinesafety/Vaccine_Monitoring/Index.html
 - ▶ Why it's important to monitor vaccine safety

Useful Web Sites for Travel Medicine

- ▶ Centers for Disease Control and Prevention (CDC): www.cdc.gov/travel
- ▶ World Health Organization (WHO): www.who.int
- ▶ International Society of Travel Medicine: www.istm.org
- ▶ US Department of State: www.travel.state.gov
- ▶ International Society of Infectious Diseases global electronic reporting and monitoring (Promed) : www.promedmail.org
- ▶ Global Disease Alert Map: www.healthmap.org/en
- ▶ International Association for Medical Assistance to Travelers: www.iamat.org

